

EOS Production Sites

Network Performance Report: February 2011

This is a monthly summary of EOS network performance testing between production sites -- comparing the measured performance against the requirements. **Significant improvements are noted in Green, Network problems in Red, System problems and Requirements issues in Gold, Issues in Orange, and other comments in Blue**

Highlights:

- **Mostly stable flows with reduced congestion at GSFC**
 - **GPA 3.65** (was 3.73 last month)
- **Requirements:** updated to Handbook 1.4.3 in May '09 (was 1.4.2 previously)
 - Many Requirements dropped significantly (under review)
- **Only 4 flows below "Excellent"; only 1 below "Adequate":**
 - **GSFC MODAPS-PDR to EROS ("Low")**
 - High user flow this month: 162 mbps average.
- **NSIDC:** Route change to selected destinations on 28 January; now using Internet2 from FRGP vs NLR previously. **Performance improvement observed.**

Ratings Changes:

Upgrades: ↑ None

Downgrades: ↓

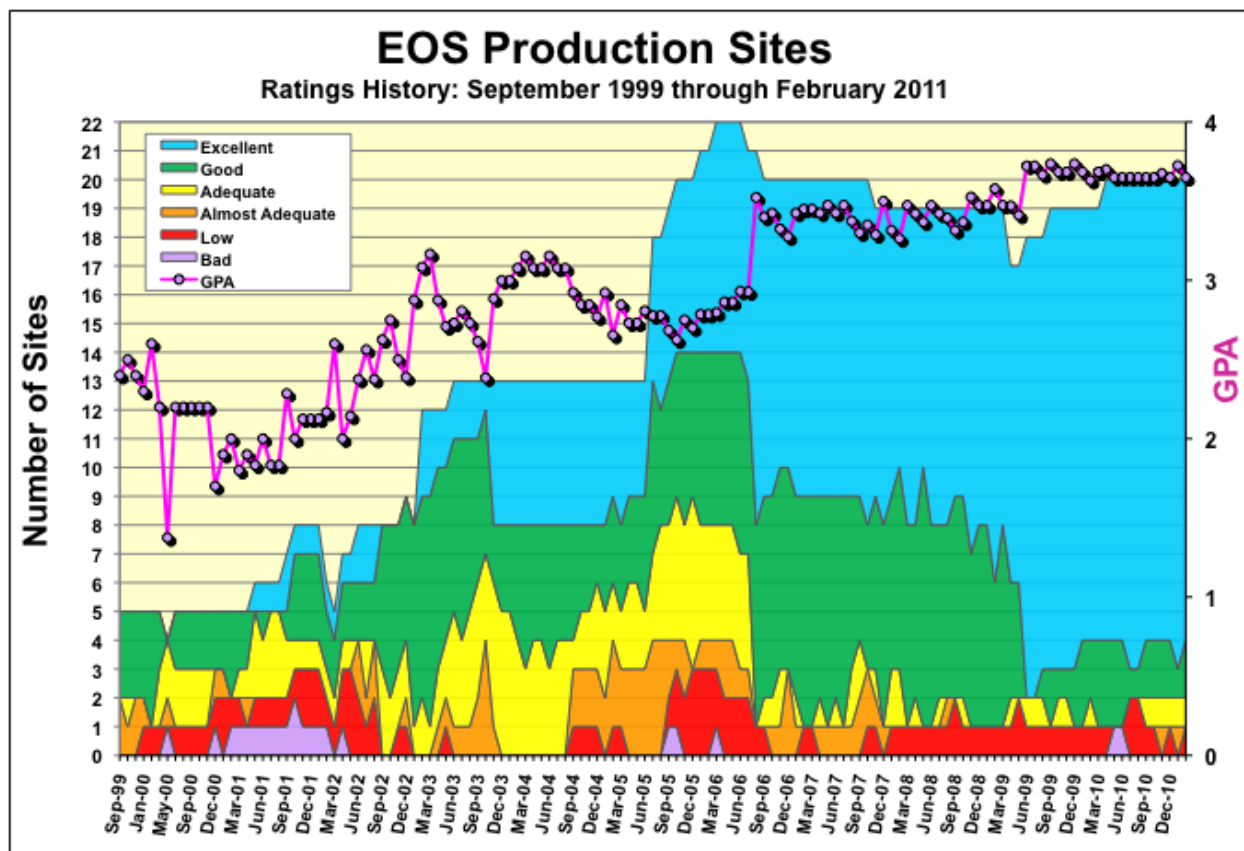
GSFC → EROS: **Almost Adequate** → **Low**

GSFC → NSIDC: **Excellent** → **Good**

Ratings Categories:

Rating	Value	Criteria
Excellent:	4	Total Kbps > Requirement * 3
Good:	3	1.3 * Requirement <= Total Kbps < Requirement * 3
Adequate:	2	Requirement < Total Kbps < Requirement * 1.3
Almost Adequate:	1.5	Requirement / 1.3 < Total Kbps < Requirement
Low:	1	Requirement / 3 < Total Kbps < Requirement / 1.3
Bad:	0	Total Kbps < Requirement / 3

Where Total Kbps = Integrated Kbps (where available), otherwise just iperf

Ratings History:

The chart above shows the number of sites in each classification since EOS Production Site testing started in September 1999. Note that these ratings do NOT relate to absolute performance – they are relative to the EOS requirements.

Requirements Basis:

While the long-term plan is to use the requirements from the EOSDIS network requirements database, the database does not appear ready to be used for that purpose at this time. ESDIS is in process of reviewing its network ICD's with each instrument team. When these ICDs are completed, the database will be updated with the ICD values, and those values will be used here as well.

Until then, the requirements are based on the EOS Networks Requirements Handbook, Version 1.4.3 (from which the original database requirements were derived). Previously, the requirements were derived from version 1.4.2.

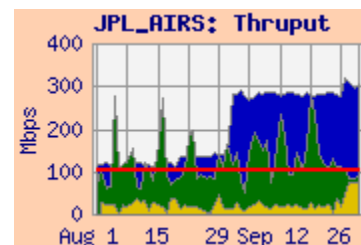
One main difference between Handbooks 1.4.2 and 1.4.3 is that most flows which occur less than once per day were averaged over their production period. These flows were typically monthly Level 3 data transfers, which were specified to be sent in just a few hours. However, they could easily be accommodated either between the per-orbit flows, or within the built-in contingency. Previously, these flows were added in linearly to the requirements, making the requirements unrealistically high.

Additionally, the contingency for reprocessing flows greater than 2X reprocessing was reduced. These flows WERE a major component of the contingency, so adding additional contingency on top of these flows was considered excessive.

However, it seems likely that there are some flows which have been omitted from version 1.4.3. For example, the GES DISC to KNMI requirement for Level 1+ data (without contingency) was 1.4 mbps in version 1.4.2, but only 22 kbps in version 1.4.3. The user flow has been averaging about 1.4 mbps, suggesting that version 1.4.2 was correct, and that version 1.4.3 has omitted something.

Integrated Charts:

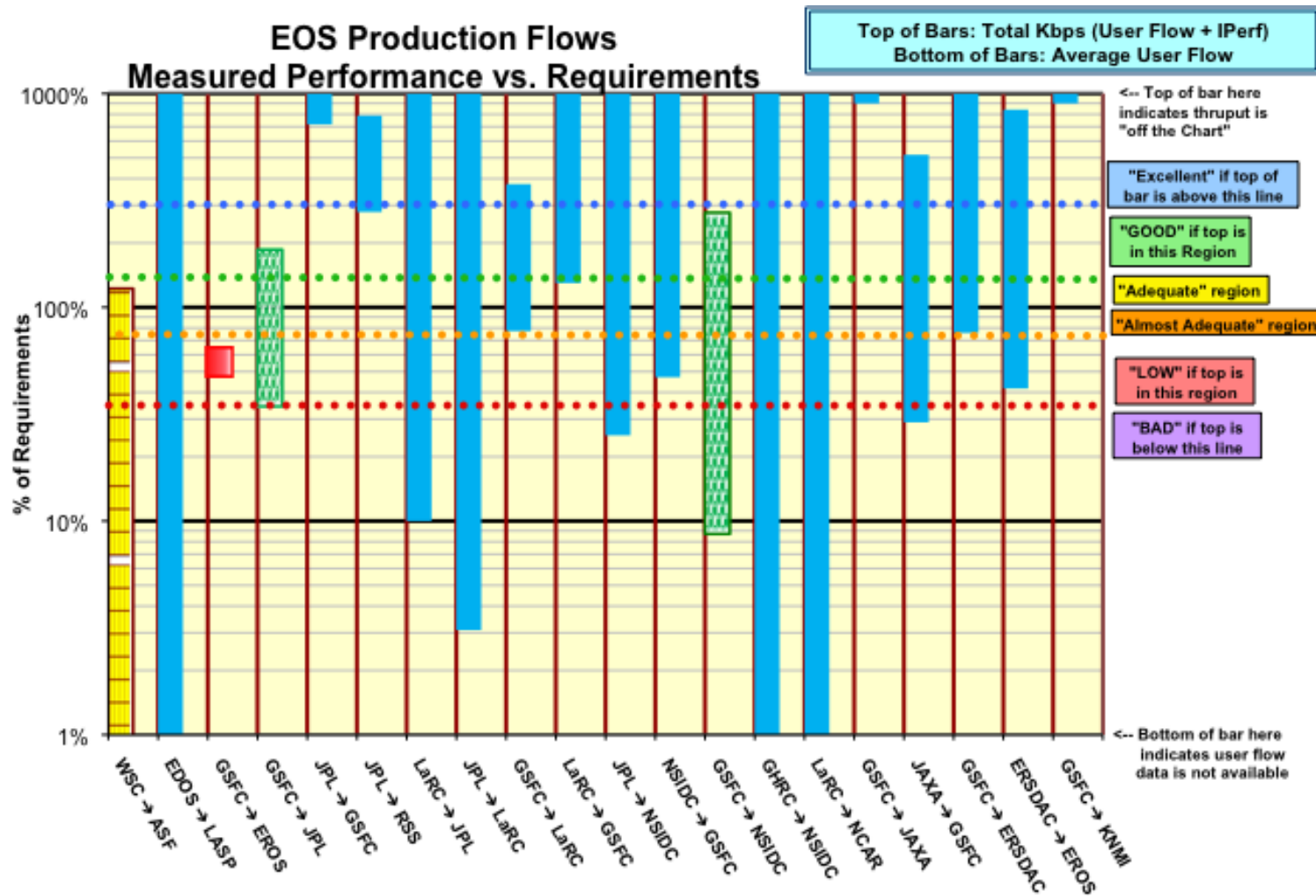
Integrated charts are included with site details, where available. These charts are "Area" charts, with a "salmon" background. A sample Integrated chart is shown here. The yellow area at the bottom represents the daily average of the user flow from the source facility (e.g., GSFC, in this example) to the destination facility (JPL, in this example) obtained from routers via "netflow". The green area is stacked on top of the user flow, and represents the "adjusted" daily average iperf throughput between the source-destination pair most closely corresponding to the requirement. This iperf measurement essentially shows the circuit capacity remaining with the user flows active. Adjustments are made to compensate for various systematic effects, and are best considered as an approximation. The red line is the requirement for the flow from the source to destination facilities. On some charts a blue area is also present – usually "behind" the green area – representing adjusted iperf measurements from a second source node at the same facility.



Network Requirements vs. Measured Performance

February 2011		Requirements (mbps)		Testing				Ratings	
Source → Destination	Instrument (s)	Current	Old	Source → Dest Nodes	Average User Flow mbps	iperf Median mbps	Integrated mbps	Ratings re HB 1.4.3 Requirements	
		HB 1.4.3	HB 1.4.2					This Month	Last Month
WSC → ASF	ALOS	96.0	n/a	WSC → ASF		117.3		Adequate	Adq
EDOS → LASP	ICESat, QuikScat	0.4	0.4	GSFC-EDOS → LASP (blue)	0.00028	5.7		Excellent	Ex
GSFC → EROS	MODIS, LandSat	342.9	345.9	MODAPS-PDR → EROS LPDAAC	162.4	155.7	217.3	Low	AA
GSFC → JPL	AIRS, MLS, ISTs	101.7	43.6	GES DISC → JPL-AIRS	35.0	177.2	189.3	Good	Good
JPL → GSFC	MLS	0.6	7.4	JPL-PTH → GSFC-ESDIS-PTH	4.0	86.1	86.6	Excellent	Ex
JPL → RSS	AMSR-E	0.5	2.5	JPL-PODAAC → RSS	1.4	3.5	3.8	Excellent	Ex
LaRC → JPL	TES, MISR	23.0	43.7	LARC-DAAC → JPL-TES	2.3	249.0		Excellent	Ex
JPL → LaRC	TES	1.5	4.4	JPL-PTH → LARC-PTH	0.05	63.9		Excellent	Ex
GSFC → LaRC	CERES, MISR, MOPITT	31.3	60.5	GSFC-EDOS → LDAAC	24.2	109.1	118.2	Excellent	Ex
LaRC → GSFC	CERES, MODIS, TES	0.4	0.2	LDAAC → GES DISC	0.47	448.8	448.8	Excellent	Ex
JPL → NSIDC	AMSR-E	0.2	1.3	JPL-PODAAC → NSIDC	0.04	34.4		Excellent	Ex
NSIDC → GSFC	MODIS, ICESAT, QuikScat	0.6	0.5	NSIDC DAAC → GES DISC	0.27	310.2	310.2	Excellent	Ex
GSFC → NSIDC	MODIS, ICESAT, QuikScat	27.6	34.5	MODAPS-PDR → NSIDC-DAAC	2.4	76.4	76.4	Good	Ex
GHRC → NSIDC	AMSR-E	0.5	7.5	GHRC → NSIDC DAAC (ftp)		9.8		Excellent	Ex
LaRC → NCAR	MOPITT	0.1	5.4	LDAAC → NCAR		324.4		Excellent	Ex
GSFC → JAXA	QuikScat, TRMM, AMSR	0.1	2.0	GSFC → JAXA	3.0	Testing discontinued: 31 March 2009		Excellent	Ex
JAXA → GSFC	AMSR-E	0.5	1.3	JAXA → GSFC	2.7			Excellent	Ex
GSFC → ERSDAC	ASTER	5.4	12.5	GSFC-EDOS → ERSDAC	4.1	76.9	77.2	Excellent	Ex
ERSDAC → EROS	ASTER	8.3	26.8	ERSDAC → EROS PTH	3.4	69.5	69.6	Excellent	Ex
GSFC → KNMI	OMI	0.03	3.3	GSFC-OMISIPS → KNMI ODPS	2.4	124.1	124.1	Excellent	Ex
				Significant change from v 1.4.2 (5/09) to v 1.4.3			Ratings Summary		
				Value used for ratings					
								HB 1.4.3 Req	
								Score	Prev
*Criteria:	Excellent	Total Kbps > Requirement * 3				Excellent		16	17
	Good	1.3 * Requirement <= Total Kbps < Requirement * 3				Good		2	1
	Adequate	Requirement < Total Kbps < Requirement * 1.3				Adequate		1	1
	Almost Adequate	Requirement / 1.3 < Total Kbps < Requirement				Almost Adequate		0	1
	Low	Requirement / 3 < Total Kbps < Requirement / 1.3				Low		1	0
	Bad	Total Kbps < Requirement / 3				Bad		0	0
								Total Sites	
								20	20
Notes:	Flow Requirements include:								
	TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS							GPA	
								3.65	3.73

This graph shows a bar for each source-destination pair – relating the measurements to the requirements for that pair. The bottom of each bar represents the average measured user flow from the source site to the destination site (as a percent of the requirement). Thus the bottom of each bar indicates the relationship between the requirements and actual flows. Note that the requirements generally include a 50% contingency factor above what was specified by the projects, so a value of 66% (dotted orange line) would indicate that the project is flowing as much data as requested. The top of each bar similarly represents the integrated measurement, combining the user flow with Iperf measurements – this value is used to determine the ratings.



1) EROS:

Ratings: GSFC→ EROS: ↓ **Almost Adequate** → **Low**
 ERSDAC→ EROS: Continued **Excellent**

Web Page: <http://ensight.eos.nasa.gov/Organizations/production/EROS.shtml>
http://ensight.eos.nasa.gov/Organizations/production/EROS_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → EROS LPDAAC	234.8	155.7	93.3	162.4	217.3
GSFC-EDOS → EROS LPDAAC	187.0	147.2	59.5		
GES DISC → EROS LPDAAC	203.3	144.3	79.1		
ERSDAC → EROS LPDAAC	71.1	69.5	34.4	3.4	69.6
NSIDC SIDADS → EROS PTH	86.6	72.3	48.1		
GSFC-ENPL → EROS PTH	404.6	324.3	226.7		
GSFC-NISN → EROS PTH	400.7	322.4	224.5		
LaRC PTH → EROS PTH	182.0	157.7	113.5		

Requirements:

Source → Dest	Date	mbps	Rating
GSFC → EROS	CY '08-11	343	Low
ERSDAC → EROS	FY '06 -'10	8.3	Excellent

Comments:

1.1 GSFC → EROS: The rating is based on the MODAPS-PDR Server to EROS LP DAAC measurement, since that is the primary flow. The route is via the Doors to NISN SIP, via the NISN 10 gbps backbone to the NISN Chicago CIEF, then via GigE to the StarLight Gigapop, peering with the EROS OC-12 (622 mbps). EROS will upgrade this OC-12 to an OC-48 (2.5 gbps) in March '11.

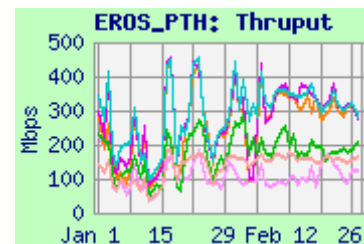
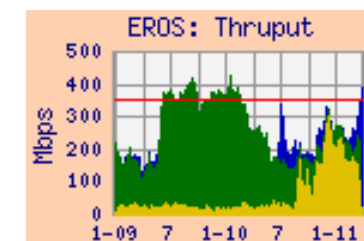
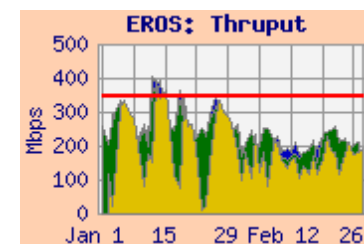
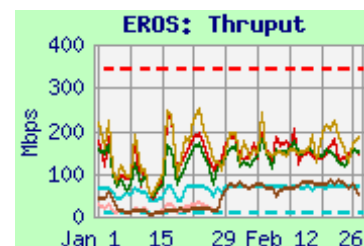
The user flow was again high this month, reportedly based on a science user at EROS acquiring MODIS data. It is now almost 50% of the nominal requirement (which includes MODIS reprocessing). The steady high user flow began in October '10, as seen on the long term integrated graph.

Iperf performance from GSFC-NISN and GSFC-ENPL to EROS-PTH were significantly affected by the high incoming user flow as well. The GSFC-ENPL host has a direct connection to the MAX; its route is via MAX to Internet2 to StarLight in Chicago. Performance is similar to the GSFC-NISN source. Both are mainly limited by the OC-12 to EROS.

1.2 ERSDAC → EROS: **Excellent**. See section 9 (ERSDAC) for further discussion.

1.3 NSIDC → EROS: Performance improvement observed on January 28 due to route change -- now using Internet2 from FRGP vs NLR previously.

1.4 LaRC → EROS: The throughput from LaRC-PTH to EROS-PTH was also affected by the high user inflow to EROS. The route is via NISN SIP to the Chicago CIEF to StarLight.



2) to GSFC

Ratings: NSIDC → GES DISC: Continued **Excellent**
 LDAAC → GES DISC: Continued **Excellent**
 JPL → GSFC: Continued **Excellent**

Web Pages:

<http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml>

http://ensight.eos.nasa.gov/Organizations/production/GSFC_PTH.shtml

http://ensight.eos.nasa.gov/Missions/icesat/GSFC_ISIPS.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow
	Best	Median	Worst	
EROS LPDAAC → GES DISC	216.4	162.5	74.4	
EROS PTH → GSFC-ESDIS PTH	383.0	281.1	170.5	
JPL-PTH → GSFC-ESDIS PTH	88.7	86.1	81.3	4.0
LDAAC → GES DISC	521.3	448.8	288.8	0.47
LARC-ANGe → GSFC-ESDIS PTH	512.5	424.7	341.8	
NSIDC DAAC → GES DISC	359.6	310.2	204.8	0.27
NSIDC DAAC → GSFC-ISIPS	135.4	131.2	119.1	

Requirements:

Source → Dest	Date	Mbps	Rating
NSIDC → GSFC	CY '06 – '10	0.6	Excellent
LDAAC → GES DISC	FY '07 – '10	0.4	Excellent
JPL → GSFC combined	CY '06 – 10	3.2	Excellent

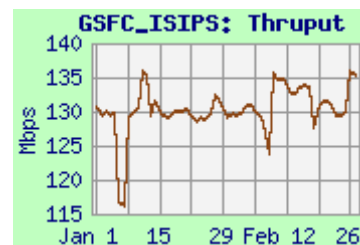
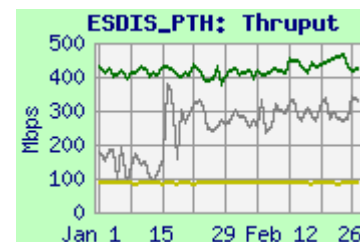
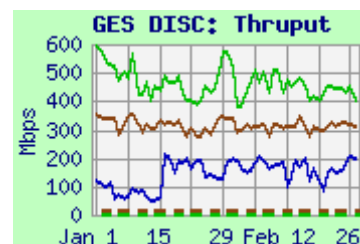
Comments:

EROS, EROS-PTH → GSFC: The thruput for tests from EROS and EROS-PTH to GES DISC and ESDIS-PTH improved in Mid January, and were mostly stable in February.

JPL → GSFC: Thruput was again very stable this month. With the modest requirement (reduced from 7.4 mbps in May '09), the rating remains "Excellent". The actual user flow is above but fairly consistent with the reduced requirement.

LaRC → GSFC: Performance from LDAAC to GES DISC and LaRC ANGe to ESDIS-PTH remained way above 3 x the modest requirement, so the rating continues as "Excellent". The user flow this month was higher than usual, but consistent with the requirement.

NSIDC → GSFC: Performance from NSIDC to GSFC (DAAC and ISIPS) was very steady this month. The user flow was below the low requirement (reduced from 13.3 mbps in May '09); the rating remains "Excellent".

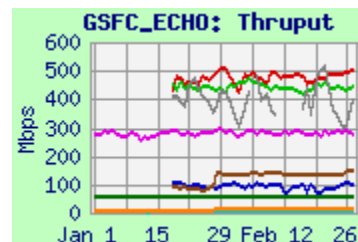


2.2 GSFC-ECHO: EOS Metadata Clearinghouse

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC_ECHO.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	109.2	94.4	39.6
EROS LPDAAC ftp	9.9	9.4	5.3
GES DISC	517.3	480.3	349.0
GES DISC ftp	296.8	280.9	136.5
LaRC ASDC DAAC	504.8	442.0	386.7
LaRC ASDC DAAC ftp	58.5	57.7	53.4
MODIS-LADSWEB	449.5	378.7	260.7
NSIDC DAAC	140.4	136.9	122.5
NSIDC DAAC ftp	11.4	11.3	5.9



Comments:

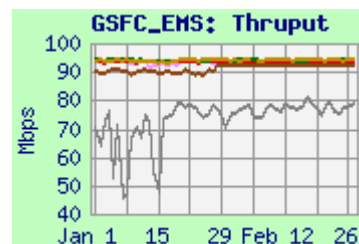
Iperf testing was down from mid December until mid January due to node problems. Performance was stable from all sources. Thruput from NSIDC improved on January 28 with the route change from NLR to Internet2. Performance is mostly limited by TCP window size – especially on ftp with long RTT.

2.3 GSFC-EMS: EOS Metrics System

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC_EMS.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS-PTH	88.9	77.2	30.2
ESDIS-PTH	94.2	94.1	50.3
GES DISC	93.8	93.8	44.1
LARC-PTH	94.1	94.0	48.2
MODAPS-PDR	94.1	94.1	50.5
NSIDC-SIDADS	92.9	92.3	44.7



Comments:

Testing is performed to GSFC-EMS from the above nodes, iperf only. Results are mostly very steady. Performance limitation is from the 100 mbps fast-E connection.

3) JPL:

3.1) GSFC → JPL:

Ratings: GSFC → JPL: Continued **Good**

Web Pages: http://ensight.eos.nasa.gov/Missions/aqua/JPL_AIRS.shtml
http://ensight.eos.nasa.gov/Missions/aura/JPL_MLS.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_QSCAT.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_PODAAC.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-GES DISC → JPL-AIRS	234.7	177.2	100.2	35.0	189.3
GSFC-NISN → JPL-AIRS	155.6	153.2	146.8		
ESDIS-PTH → JPL-AIRS	114.6	76.7	51.7		
GSFC-NISN → JPL-PODAAC	125.2	99.8	68.9		
ESDIS-PTH → JPL-PODAAC	55.3	37.4	24.2		
GSFC-NISN → JPL-QSCAT	88.2	83.6	77.9		
ESDIS-PTH → JPL-QSCAT	56.1	42.1	24.7		
GSFC-NISN → JPL-MLS	284.4	263.7	222.5		
ESDIS-PTH → JPL-MLS	110.1	71.2	45.1		

Requirements:

Source → Dest	Date	Mbps	Rating
GSFC → JPL Combined	FY '08-'10	101.7	Good
GSFC → JPL AIRS	FY '08-'10	98	Good
GSFC → JPL PODAAC	FY '08-'11	1.5	Excellent
GSFC → JPL QSCAT	FY '08-'11	0.6	Excellent
GSFC → JPL MLS	FY '08-'10	2.1	Excellent

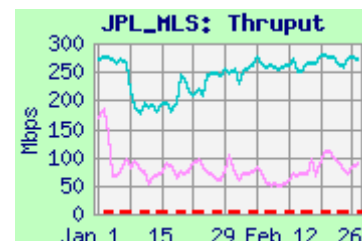
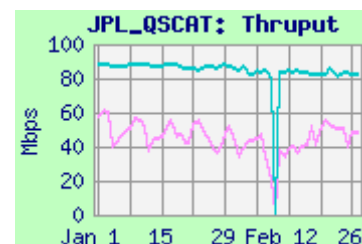
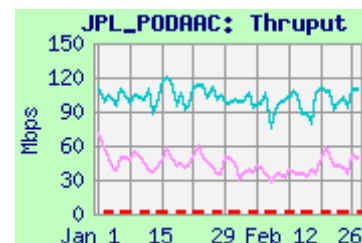
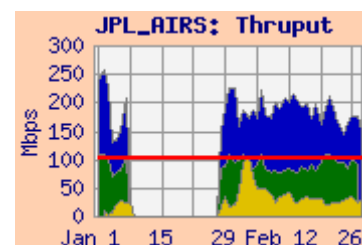
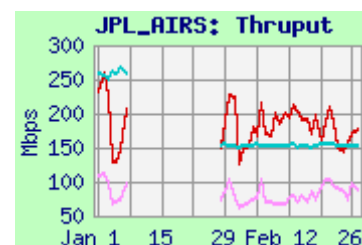
Comments: The user flow from GSFC/EOS to JPL combined increased this month (was 18 mbps last month, and 29 mbps the previous month).

AIRS, Overall: Thruput from **GES DISC** was almost 2 x the AIRS requirement, so the AIRS rating remains **Good**. The **JPL overall rating** is based on this test compared with the sum of all the GSFC to JPL requirements – the thruput is also below 3x this requirement, so the overall rating remains **Good**. The AIRS test node was down for most of January – while being rebuilt.

PODAAC: **ESDIS-PTH** is connected at 1 gig to the 10 gig EBnet backbone. Performance is lower than from **GSFC-NISN**, and previously from **EBnet-PTH** due to packet loss on **EBnet**, but is still way above the 1.5 mbps PODAAC requirement, rating **Excellent**.

QSCAT: Thuput from **ESDIS-PTH** to QSCAT was also lower than from **GSFC-NISN**, or previously from **EBnet-PTH**, but is also well above the modest requirement, rating **Excellent**. User flow from GSFC to QSCAT averaged only about 1.2 kbps again this month.

MLS: Thruput from **ESDIS-PTH** was mostly stable, but thruput was much better from **GSFC-NISN**. The rating remains **Excellent**.



3.2) LaRC → JPLRating: Continued **Excellent**

Web Pages:

http://ensight.eos.nasa.gov/Organizations/production/JPL_TES.shtmlhttp://ensight.eos.nasa.gov/Missions/terra/JPL_MISR.shtmlhttp://ensight.eos.nasa.gov/Organizations/production/JPL_PTH.shtml**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
LaRC DAAC → JPL-TES	351.8	249.0	100.8	0.14	249.0
LaRC PTH → JPL-TES	156.2	122.5	97.6		
LaRC PTH → JPL-TES sftp	13.2	12.5	8.3		
LaRC ANGE → JPL-PTH	79.5	75.9	75.7	2.3	75.9
LaRC PTH → JPL-PTH	82.4	53.0	28.7		
LaRC PTH → JPL-PTH sftp	32.3	32.3	31.5		
LaRC DAAC → JPL-MISR	72.3	59.6	40.8	1.9	60.1
LaRC PTH → JPL-MISR	85.3	79.6	48.7		

Requirements:

Source → Dest	Date	Mbps	Rating
LaRC DAAC → JPL-TES	FY '07 – '10	7.0	Excellent
LaRC DAAC → JPL-MISR	FY '07 – '10	32.9	Good
LaRC → JPL-Combined	FY '07 – '10	39.9	Excellent

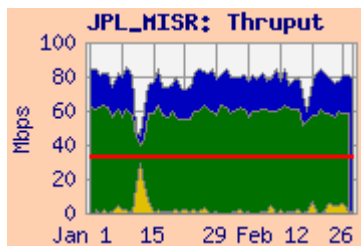
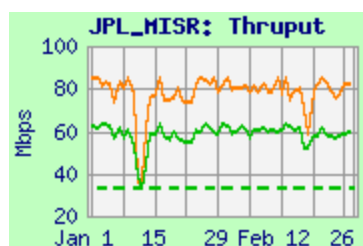
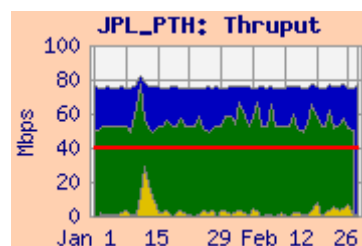
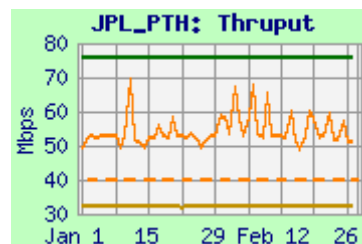
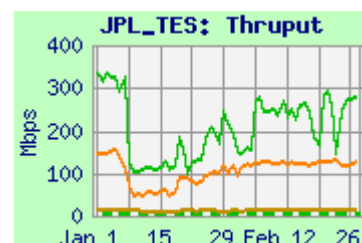
Note: The overall flow decreased to 2.3 mbps average, from 3.4 mbps last month. About 80% of the LaRC to JPL flow this month was for MISR.

LaRC → JPL (Overall, TES): Median performance from LaRC ASDC DAAC to JPL-TES remains well over 3 x the TES and combined requirements, so the TES and Overall ratings remain "Excellent". User flow to TES is very low.

Sftp performance from LaRC-PTH to JPL-TES is quite low, limited by the Sftp application on the TES node. Sftp results are better from LaRC-PTH to JPL-PTH (than to TES) because JPL-PTH uses a larger TCP window size.

The JPL-PTH integrated graph shows the overall LaRC to JPL user flow (vs. the overall requirement).

LaRC → JPL (MISR): the median throughput is above the requirement, by more than 30%, so the MISR rating remains "Good". The average user flow to MISR decreased from 2.8 mbps last month, and is only about 6% of the requirement.



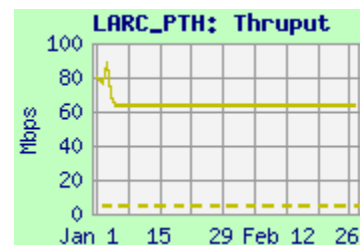
3.3) JPL → LaRCRating: Continued **Excellent**Web Page: http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
JPL-PTH → LaRC PTH	63.9	63.9	62.8	0.045	63.9

Requirements:

Source → Dest	Date	Mbps	Rating
JPL-PTH → LaRC PTH	FY '07 – '10	1.5	Excellent

Comment: This requirement is primarily for TES products produced at the TES SIPS at JPL, being returned to LaRC for archiving; it was reduced from 4.4 mbps in May '09 (and had been reduced in April '08 from 52.6 mbps). This month the thrupt was stable at the lower of its two common states – 64 and 85 mbps. The rating remains “**Excellent**”. The user flow was small and well below the requirement.

**4) GSFC → LaRC:**Rating: Continued **Excellent**

Web Pages : <http://ensight.eos.nasa.gov/Organizations/production/LARC.shtml>
http://ensight.eos.nasa.gov/Organizations/production/LARC_ANGe.shtml
http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GES DISC → LaRC ASDC	393.2	330.1	210.8	19.5	336.1
GSFC-EDOS → LaRC ASDC	151.4	109.1	58.2		
ESDIS-PTH → LaRC-ANGe	363.6	286.5	198.4		
GSFC-NISN → LaTIS	479.7	452.0	314.2		

Requirements:

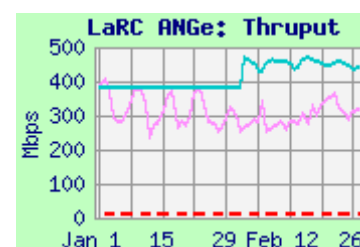
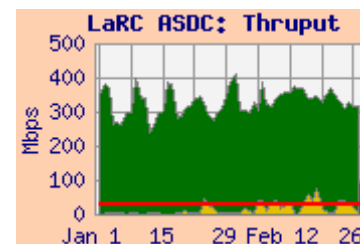
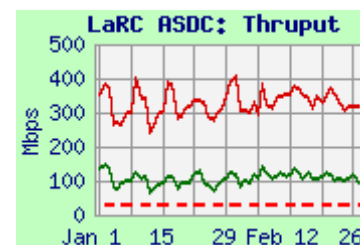
Source → Dest	Date	Mbps	Rating
GSFC → LARC (Combined)	CY '09 – '11	31.3	Excellent

Comments:

GSFC → LaRC ASDC: The rating is based on the **GES DISC** to LaRC ASDC DAAC thrupt, compared to the combined requirement. The integrated thrupt remains well above 3 x this requirement, so the rating remains “**Excellent**”.

As seen on the Integrated graph, the user flow is often lower than the requirement, except for frequent bursts.

ANGe (LaTIS): Testing to ANGe from **ESDIS-PTH** gets steady performance. Testing to LaTIS (Darrin) from **GSFC-NISN** was similar, with very consistent results.



5) Boulder CO sites:

5.1) NSIDC:

Ratings: GSFC → NSIDC: ↓ **Excellent** → **Good**
 JPL → NSIDC: Continued **Excellent**
 GHRC → NSIDC: Continued **Excellent**

Web Pages: <http://ensight.eos.nasa.gov/Organizations/production/NSIDC.shtml>
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_SIDADS.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_PTH.shtml

The NSIDC DAAC was disconnected from NISN PIP in December '09 – all flows now go via the UCB campus, usually via FRGP to Internet2 or NLR. Thus the DAAC competes with the students for network capacity. So DAAC performance improved in mid December, when the students left for winter break.

In late January the path to selected destinations switched from using NLR to Internet2. This improved performance in some cases (e.g., GHRC, see next section).

It is planned to upgrade the UCB connection to FRGP from 1 gbps to 10 gbps in 2011.

Test Results: NSIDC S4PA

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODIS-PDR → NSIDC DAAC	146.6	76.4	39.1	2.4	76.4
GES-DISC → NSIDC DAAC	183.8	110.9	43.6		
GSFC-EDOS → NSIDC DAAC	111.1	61.2	24.1		
GSFC-ISIPS → NSIDC (iperf)	97.6	65.7	27.3		
JPL PODAAC → NSIDC DAAC	36.8	34.4	8.8		

Requirements:

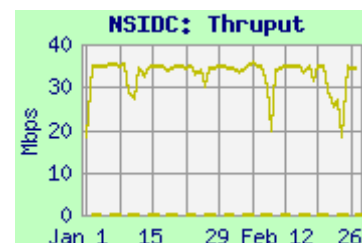
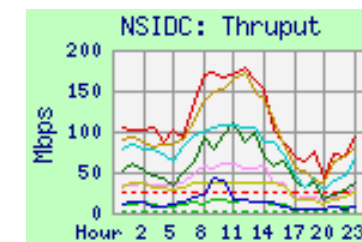
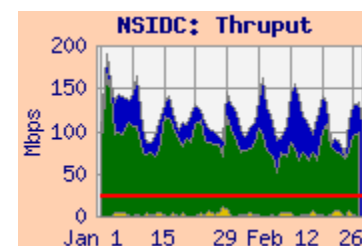
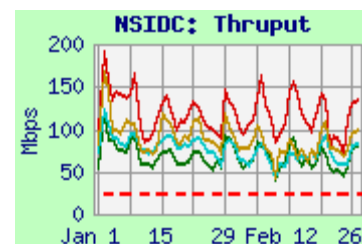
Source → Dest	Date	Mbps	Rating
GSFC → NSIDC	CY '07 – '10	27.6	Good
JPL → NSIDC	CY '07 – '10	0.2	Excellent
GHRC → NSIDC	CY '07 – '10	0.5	Excellent

Comments: GSFC → NSIDC S4PA: This rating is based on testing from the MODIS-PDR server to the NSIDC DAAC, since this is the primary production flow. The requirement was reduced in May '09 from 34.5 mbps (and was 64 mbps in April '08). MODIS performance decreased this month (especially the daily worst case) with student returning from holidays.

The integrated thrupt from MODIS remains above the requirement, now by slightly less than 3x, so the rating drops to "**Good**". The user flow was similar month, and is still less than 10% of the reduced requirement. Testing from other GSFC sources, including GES DISC, EDOS, and ISIPS, is similar to MODIS.

As the hourly graph shows, performance to NSIDC exhibits a diurnal variation – thrupt is better in the middle of the night when the students are not on line, but decreases significantly when they are.

JPL PODAAC → NSIDC S4PA: The requirement was reduced from 1.34 mbps in May '09. Thrupt from PODAAC to NSIDC has been mostly stable with a similar diurnal cycle since testing was moved to use Internet2 in September '09; the rating remains "**Excellent**".



5.1) NSIDC: (Continued): Test Results: GHRC to NSIDC

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GHRC → NSIDC DAAC (nuttcp)	23.7	9.5	3.0
GHRC → NSIDC DAAC (ftp pull)	39.2	9.8	2.2

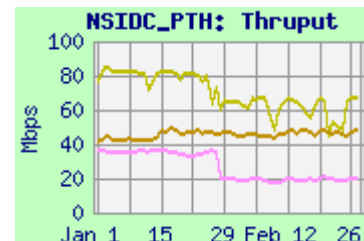
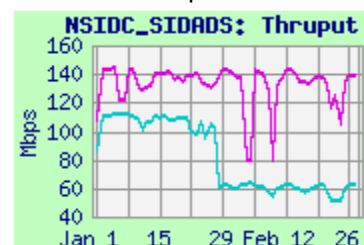
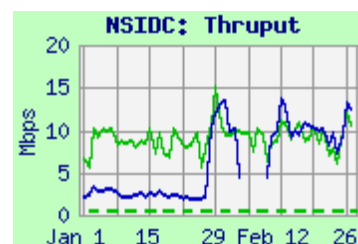
GHRC, GHRC-ftp → NSIDC S4PA: GHRC (NSSTC, UAH, Huntsville, AL) sends AMSR-E data to NSIDC via NLR / Internet2. Testing from GHRC to NSIDC was disabled in August '09 due to firewall changes at NSIDC. Testing resumed in December '10 by switching to nuttcp -- the rating is now based on this reverse nuttcp testing. The median nuttcp throughput is more than 3x the 0.5 mbps requirement, so the rating remains "**Excellent**". Performance improved at the end of January, with the switch from NLR to I2 at FRGP.

Test Results: NSIDC SIDADS, PTH

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	143.3	135.4	65.1
GSFC-NISN → NSIDC-SIDADS	63.0	60.1	32.9
ESDIS-PTH → NSIDC-PTH	22.0	19.2	15.3
MODIS-PDR → NSIDC-PTH	52.5	46.2	35.8
JPL PTH → NSIDC-PTH	67.8	63.9	11.5

GSFC → NSIDC-SIDADS: Thruput via Internet2 to SIDADS from ENPL and GSFC-NISN showed similar diurnal variation but was otherwise steady. The drop from GSFC-NISN, ESDIS-PTH, and JPL at the end of January was due to increased RTT from the NLR to I2 switch.

NSIDC-PTH: Testing to NSIDC-PTH remains mostly stable.

**5.2) LASP:**

Ratings: GSFC → LASP: Continued **Excellent**

Web Page: <http://ensight.eos.nasa.gov/Organizations/production/LASP.shtml>

Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC EDOS → LASP blue	7.80	5.66	3.81
ESDIS-PTH → LASP blue (iperf)	8.17	7.13	6.08
ESDIS-PTH → LASP blue (scp)	3.32	3.20	2.43
GSFC ENPL → LASP green	167.8	83.2	24.6

Requirement:

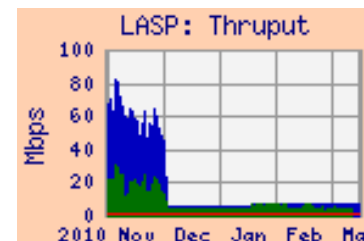
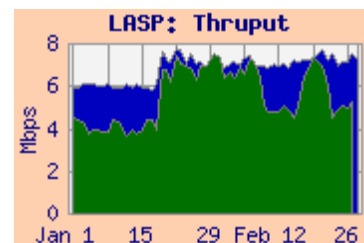
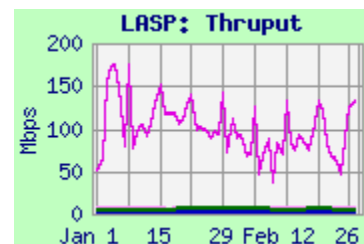
Source → Dest	Date	Mbps	Rating
GSFC-EDOS → LASP (blue)	CY '07 – '10	0.4	Excellent

Comments: In early December, LASP's connection to NISN PIP was rerouted: previously was 100 mbps from CU-ITS via NSIDC; this was changed to be 10 mbps direct from CU-ITS. This was temporary until the connection to the NISN POP in Denver was made in mid January. Thruput improved slightly at that time.

Thruput was consistent with the new circuit limitation. The median thruput from EDOS remained well over 3x the requirement, so the rating remains "**Excellent**". The average user flow again this month was below typical at only 0.3 kbps.

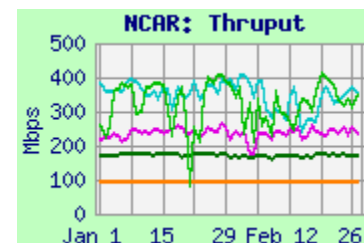
ESDIS-PTH also tests to the test node on LASP's blue network with steady thruput. SCP performance from ESDIS-PTH to LASP was also very steady.

Performance from GSFC-ENPL to a node on LASP's green network via Internet2 was much higher, but also was subject to congestion from students -- like NSIDC systems.



5.3) NCAR:Ratings: LaRC → NCAR: Continued **Excellent**Web Pages <http://ensight.eos.nasa.gov/Missions/terra/NCAR.shtml>**Test Results:**

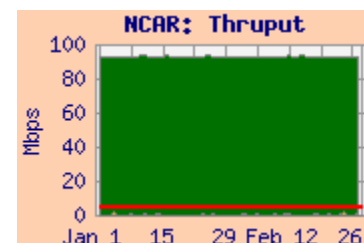
Source	Medians of daily tests (mbps)			Requirement
	Best	Median	Worst	
LaRC ASDC	437.7	324.4	104.6	0.1
LaRC PTH	180.0	170.6	133.0	
GSFC-ENPL-GE	314.5	237.0	164.4	n/a
GSFC-ENPL-FE	93.6	93.5	93.3	
GSFC-NISN	419.3	343.0	177.7	



Comments: NCAR (Boulder, CO) has a SIPS for MOPITT (Terra, from LaRC), and has MOPITT and HIRDLS (Aura, from GSFC) QA requirements.

Thruput from **LaRC ASDC** was somewhat noisy (4:1 best : worst ratio), but the median remained well above 3 x the reduced requirement, so the rating remains **Excellent**.

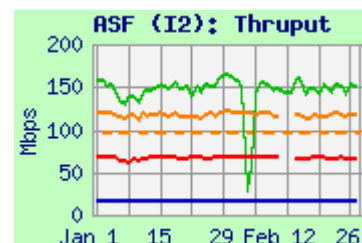
From **GSFC-NISN**, the route is via NISN to the MAX (similar route and performance (but better daily worst) as from LaRC). From **GSFC-ENPL-GE**, with a Gig-E connection to MAX, the median thruput was a bit lower. Performance from all sources is somewhat noisy but mostly stable. The average user flow from GSFC this month was 0.6 mbps, compared with 0.4 mbps in January, after a large burst in December.

**6) ASF**Ratings: WSC → ASF: Continued **Adequate**Web Page: <http://ensight.eos.nasa.gov/Organizations/production/ASF2.shtml>**Test Results:**

Source	Medians of daily tests (mbps)			Requirement	Rating
	Best	Median	Worst		
WSC	121.9	117.3	102.6	96	Adequate
WSC-SFTP	68.6	67.1	52.9		
GSFC ENPL	173.8	148.9	112.7		
GSFC-SCP	17.2	16.9	16.4		

Comments: **IONet:** The ASF IONet host and firewall was reconfigured in October '07, and all IONet testing stopped at that time.

Testing to ASF is for the ALOS mission. The route from **WSC** is via NISN SIP, peering with Internet2 at one of several possible peering points (usually StarLight in Chicago). Internet2 connects to the "Pacific Northwest Gigapop" (PNW) in Seattle. From there the University of Alaska – Fairbanks (UAF) has a dedicated OC-12 circuit to campus, then via campus LAN to the Alaska Satellite Facility (ASF). In February 2010, policing was installed at the WSC source at 250 mbps. That steadied the thruput significantly.



The median iperf thruput from **WSC** remains above requirement, but by less than 30%, so the rating remains **Adequate**.

From **GSFC**, iperf thruput is higher, but SCP thruput is lower, even though the RTT is also lower. This is under investigation.

7) Remote Sensing Systems (RSS):Rating: Continued **Excellent**Web Page <http://ensight.eos.nasa.gov/Missions/aqua/RSS.shtml>**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated	Requirement
	Best	Median	Worst			
JPL → RSS	5.69	3.50	1.38	1.35	3.81	0.5

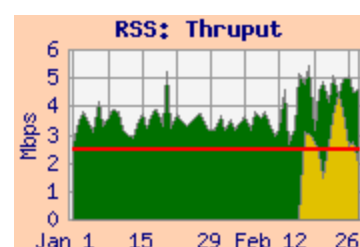
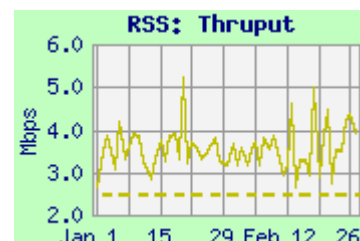
Comments: RSS (Santa Rosa, CA) is a SIPS for AMSR-E (Aqua), receiving L1 data from JAXA via JPL, and sending its processed L2 results to GHRC (aka NSSTC) (UAH, Huntsville, AL).

User flow data on this circuit is now being obtained from the NISN SIP router at ARC. The integrated graphs show that periods of low iperf performance are attributable to higher user flow.

The requirement was reduced with handbook 1.4.3 (was 2.5 mbps previously). The median iperf was more than 3 x the reduced requirement, so the rating remains “**Excellent**”.

RSS currently is connected to NISN SIP via 4 x T1s to NASA ARC (total 6 mbps). Planning is underway to switch to a higher speed circuit from a commercial ISP in the area.

Note that with the present configuration (passive servers at both RSS and GHRC), the RSS to GHRC performance cannot be tested.

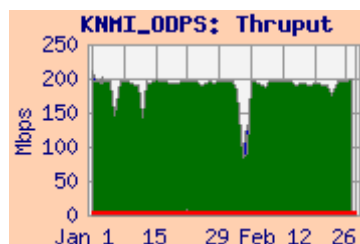
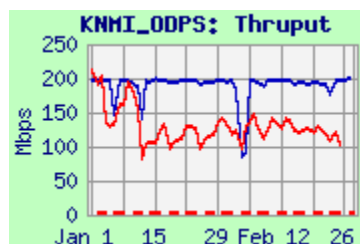
**8) KNMI:**Rating: Continued **Excellent**Web Pages http://ensight.eos.nasa.gov/Missions/aura/KNMI_ODPS.shtml**Test Results:**

Source → Dest	Medians of daily tests (mbps)			Reqmt
	Best	Median	Worst	
OMISIPS → KNMI-ODPS	165.0	124.1	85.6	0.03
GSFC-ENPL → KNMI-ODPS	202.3	195.5	152.0	

Comments: KNMI (DeBilt, Netherlands) is a SIPS and QA site for OMI (Aura). The route from GSFC is via MAX to Internet2, peering in DC with Géant's 10 gbps circuit to Frankfurt, then via Surfnets through Amsterdam.

The rating is based on the results from OMISIPS at GSFC to the ODPS primary server, and remains “**Excellent**”. This performance improved dramatically at the end of February '10 with OMI move off of the congested EBnet GigE. The best to worst ratio is now only 2.0:1 (was 12:1 in February '10). The user flow averaged 2.4 mbps this month, (hard to see on the integrated graph). This is more consistent with the previous 3.3 mbps requirement than the current 0.03 mbps requirement (This new requirement remains under review).

Performance from GSFC-ENPL was retuned in early December, and is very steady and less noisy than from OMISIPS.



9) ERSDAC:

Ratings: **GSFC → ERSDAC:** Continued **Excellent**
ERSDAC → EROS: Continued **Excellent**
ERSDAC → JPL-ASTER-IST: Continued **Excellent**

Web Page : <http://ensight.eos.nasa.gov/Organizations/production/ERSDAC.shtml>

US ↔ ERSDAC Test Results

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-EDOS → ERSDAC	81.2	76.9	58.1	4.1	77.2
GES DISC → ERSDAC	36.5	31.3	23.1		
GSFC ENPL (FE) → ERSDAC	89.5	89.3	89.0		
ERSDAC → EROS	71.1	69.5	34.4	3.4	
ERSDAC → JPL-ASTER IST	89.9	89.7	89.6		

Requirements:

Source → Dest	FY	Mbps	Rating
GSFC → ERSDAC	'05 - '09	5.4	Excellent
ERSDAC → JPL-ASTER IST	'07- '09	0.31	Excellent
ERSDAC → EROS	'07- '09	8.3	Excellent

Comments:

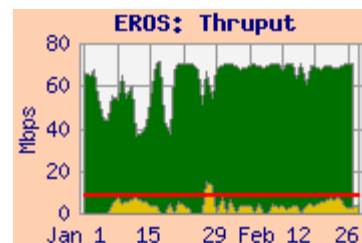
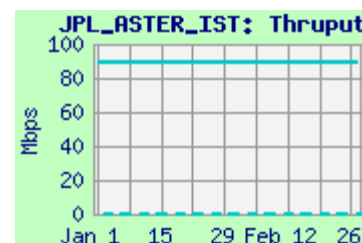
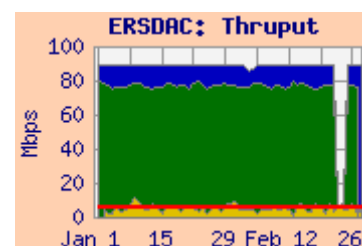
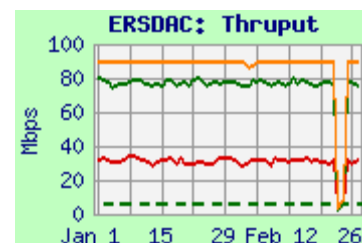
GSFC → ERSDAC: The median thrupt from EDOS remains well above 3 x the reduced requirement; the rating remains “**Excellent**”. The integrated chart shows that the user flow is stable, and consistent with the new requirement.

The anomaly from all sources in late February was due to packet loss on Internet2's Washington DC to Atlanta segment. It is interesting to note that if the segment had been down, rather than lossy, an alternate route would have automatically been switched in, and the thrupt would not have been degraded.

Thruput from GES DISC to ERSDAC is limited by packet loss at the GigE to FastE switch at Tokyo-XP. The GES DISC GigE source does not see any bottlenecks until this switch (The Internet2 and APAN backbones are 10 Gbps). It thus exceeds the capacity of the switch's FastE output circuit, causing packet loss. But the FastE connected ENPL node is limited to 100 mbps by its own interface, so does not suffer performance degrading packet loss – and the performance is much higher. EDOS uses QoS (HTB) to limit its burst rate, and thus gets much better thrupt that GES DISC – thrupt similar to ENPL-FE.

ERSDAC → JPL-ASTER-IST: The median thrupt is very stable, and remains well above the [unstated] requirement (IST requirements are generally 311 kbps), so the rating remains “**Excellent**”.

ERSDAC → EROS: The thrupt is mostly stable and remains well above the reduced requirement (was 26.8 mbps previously). The new 8.3 mbps requirement is much closer to the actual flow (especially when contingency is added). The median thrupt is more than 3 x the reduced requirement, so the rating remains “**Excellent**”.



10) US \leftrightarrow JAXA

Ratings: **US \rightarrow JAXA:** Continued **Excellent**
JAXA \rightarrow US: Continued **Excellent**

The JAXA test hosts at EOC Hatoyama were retired on March 31, 2009 (the end of the Japanese government's fiscal year). No additional testing is planned for AMSR or TRMM. [All testing to JAXA-TKSC for ALOS was terminated at the end of June '09.](#)

However, the user flow between GSFC and JAXA continues to be measured. As shown below, the average user flow this month averaged 3.0 mbps from GSFC to JAXA (with frequent peaks above 10 mbps), and 118 kbps from JAXA to GSFC (with regular peaks to 2.8 mbps). Comparing these values to the new requirement of 0.1 mbps produces a rating of "**Excellent**" in both directions. Note that the user flow to JAXA is much more consistent with the old 2.0 mbps GSFC \rightarrow JAXA requirement.

